AMENDMENTS TO THE CLAIMS:

1. (Currently Amended) The method of making a diode structure comprising:

depositing a transparent electrode layer of any one or more of the group ZnO, ZnS and CdO onto a substrate layer;

depositing an active polycrystalline semiconductor junction having an n-type layer and a p-type layer onto the transparent electrode layer under process conditions that avoid substantial degradation of the electrode layer, in which the depositing of the n-type layer is carried out with a sputtering process; and

applying a back electrode coating layer to form a diode structure.

2. (Original) The method of claim 1 in which the depositing of the active semiconductor junction is carried out at a temperature less than about 400 degrees C.

3. (Currently Amended) The method of claim 1 in which the depositing of the p-type layer of the active semiconductor junction is carried out with a sputtering process.

4. Cancelled

5. (Currently Amended) The method of claim 1 in which the depositing of the active semiconductor junction includes ~~depositing an n-type layer carried out with a sputtering process, and~~ depositing ~~a~~ the p-type layer carried out with one ~~of~~ or more of an electro deposition process, a chemical bath deposition process, and a high temperature vapor deposition process.

6. (Original) The method of claim 1 in which the electrode layer is ZnO.

7. (Original) The method of claim 6 in which the ZnO is doped with a Group III element.

8. (Original) The method of claim 7 in which the ZnO is doped with aluminum.

9. (Original) The method of claim 6 in which the layers of the active semiconductor junction are deposited in a manner limiting degradation of the ZnO transparent electrode layer to the extent that the electrical sheet resistance of the ZnO transparent electrode layer is less than about 5 ohms per square, and the transparency is greater than about 85 percent of visible light.

10. (Original) The method of claim 9 in which the layers of the active semiconductor junction are deposited in a manner limiting degradation of the ZnO transparent electrode layer to the extent that the electrical sheet resistance of the ZnO transparent electrode layer is less than about 3 ohms per square, and the transparency is greater than about 85 percent of visible light.

11. (Original) The method of claim 1 in which the diode structure is a thin-film photovoltaic cell.

12. (Original) The method of claim 1 in which the diode structure is a thin-film photovoltaic cell having a conversion efficiency greater than about 8 percent.

13. (Original) The method of claim 1 in which the diode structure is a thin-film photovoltaic cell having a conversion efficiency greater than about 10 percent.

14. (Original) The method of claim 1 in which the substrate layer is a superstrate.

15. (Currently Amended) The method of making a diode structure comprising:

depositing a transparent electrode layer of any one or more of the group ZnO, ZnS and CdO onto a flexible layer;

depositing an active polycrystalline semiconductor junction having an n-type layer and a p-type layer onto the substrate layer under process conditions that avoid substantial degradation of the electrode layer, in which the depositing of the n-type layer is carried out with a sputtering process; and

applying a back coating electrode layer to form a diode structure.

16. (Original) The method of claim 15 in which the flexible layer is a polymer layer.

17. (Original) The method of claim 15 in which the flexible layer is a metal film.

18. (Original) The method of claim 15 in which the depositing of the active semiconductor junction is a sputtering process carried out at a temperature less than about 400 degrees C.

19. (Original) The method of claim 15 in which the transparent electrode layer is ZnO doped with a Group III element.

20. (Original) The method of claim 15 in which the layers of the active semiconductor junction are deposited in a manner limiting degradation of the ZnO transparent electrode layer to the extent that the electrical sheet resistance of the ZnO transparent electrode layer is less than about 5 ohms per square, and the transparency is greater than about 85 percent of visible light.

21. (Original) The method of claim 15 in which the diode structure is a thin-film photovoltaic cell having a conversion efficiency greater than about 8 percent.

22. (Original) The method of claim 15 in which the diode structure is a thin-film photovoltaic cell having a conversion efficiency greater than about 10 percent.

23. (Currently Amended) The method of making a diode structure comprising:

depositing a transparent electrode layer of any one or more of the group ZnO, ZnS and CdO onto a substrate layer;

scribing the transparent electrode layer into sections;

depositing an active polycrystalline semiconductor junction having an n-type layer and a p-type layer onto the transparent electrode layer under process conditions that avoid substantial degradation of the electrode layer, in which the depositing of the n-type layer is carried out with a sputtering process;

scribing the active semiconductor junction into sections;

applying a back electrode coating layer to form a diode structure; and

scribing the back electrode coating layer into sections;

wherein a series of cells is formed, with each of the cells comprising one of the electrode layer sections, one of the active semiconductor junction sections, and one of the back electrode coating layer sections, and wherein the series of cells is electrically connected in series to form a monolithically integrated solar panel.

24. (Original) The method of claim 23 in which the depositing of the active semiconductor junction is carried out at a temperature less than about 400 degrees C.

25. (Currently Amended) The method of claim 23 in which the depositing of the p-type layer of the active semiconductor junction is carried out with a sputtering process.

26. (Original) The method of claim 23 in which the electrode layer is ZnO doped with a Group III element.

27. (Original) The method of claim 23 in which the layers of the active semiconductor junction are deposited in a manner limiting degradation of the ZnO transparent electrode layer to the extent that the electrical sheet resistance of the ZnO transparent electrode layer is less than about 5 ohms per square, and the transparency is greater than about 85 percent of visible light.

28. (Original) The method of claim 23 in which the diode structure is a thin-film photovoltaic cell having a conversion efficiency greater than about 8 percent.

29. (Currently Amended) The method of making a diode structure having a substrate configuration comprising:

applying a back electrode coating layer to a polymer substrate;

depositing an active crystalline semiconductor junction having a p-type layer and an n-type layer onto the ~~transparent~~ back electrode coating layer under process conditions that avoid substantial degradation of the polymer substrate, in which the depositing of the n-type layer is carried out with a sputtering process; and

depositing a transparent electrode layer of any one or more of the group ZnO, ZnS and CdO onto the semiconductor junction to form a diode structure.

30. (Original) The method of claim 29 in which the depositing of the active semiconductor junction is carried out at a temperature less than about 400 degrees C.

31. (Currently Amended) The method of claim 29 in which the depositing of the p-type layer of the active semiconductor junction is carried out with a sputtering process.

32. (Original) The method of claim 29 in which the electrode layer is ZnO doped with a Group III element.

33. (Original) The method of claim 29 in which the layers of the active semiconductor junction are deposited in a manner limiting degradation of the ZnO transparent electrode layer to the extent that the electrical sheet resistance of the ZnO transparent electrode layer is less than about 5 ohms per square, and the transparency is greater than about 85 percent of visible light.

34. (Original) The method of claim 28 in which the diode structure is a thin-film photovoltaic cell having a conversion efficiency greater than about 8 percent.

35. (Original) The method of making a tandem diode structure comprising:

depositing the first transparent front electrode layer of any one or more of the group ZnO, ZnS and CdO onto a substrate layer;

depositing the first active semiconductor junction having an n-type layer and a p-type layer onto the first transparent electrode layer under process conditions that avoid substantial degradation of the electrode layer;

depositing a first back transparent electrode coating layer under process conditions that avoid substantial degradation of the top electrode layer, to form a first diode structure and to form a first layer of a tunnel junction;

applying a second transparent front electrode coating layer of any one or more of the group ZnO, ZnS and CdO onto the back transparent coating layer of the top cell under process conditions that avoid substantial degradation of the top electrode layer, with the second transparent electrode coating layer completing the tunnel junction;

depositing a second active semiconductor junction having an n-type layer and a p-type layer onto the second transparent electrode layer under process conditions that avoid substantial degradation of both the first and second transparent electrode coating layers; and

applying a second back electrode coating layer to form a second diode structure and to complete the tandem diode structure.

36. (Original) The method of claim 35 in which the depositing of one or both of the active semiconductor junctions is carried out at a temperature less than about 400 degrees C.

37. (Original) The method of claim 35 in which the depositing of one or both of the active semiconductor junctions is carried out with a sputtering process.

38. (Original) The method of claim 35 in which one or both of the front electrode layers is ZnO doped with a Group III element.

39. (Original) The method of claim 35 in which the first back transparent electrode coating layer is ZnTe:N.